

OBSERVATIONS ON SOME INDIAN AND MALAYAN AMPHIBIA AND REPTILIA,—by DR. F. STOLICZKA, *Palæontologist of the Geol. Survey of India; Hon. Secretary, Asiat. Soc. Bengal.*

(With plates IX—XII.)

[Read and received 6th April, 1870.]

The materials upon which the notes, recorded in the present communication are based, have been derived from various sources. By far the greater number of the specimens noticed had been collected on my last year's trip along the Burmese and Malayan coast, at Penang and near Singapore, as well as on the Nicobar and Andaman islands. Only a few specimens were received through a friend from Java, and from Upper Burma, but some of the species from these countries are of great interest, as I shall have occasion to notice further on.

As regards the Indian fauna proper, I have little to say. Dr. Day furnished me with some materials which confirm the distinctness of the two species of *Enhydryna* figured by Russell, namely, his *Hoogli-pattee* and *Valakadyen*. My collectors have also procured in the Sutlej and Kulu valleys, and in the neighbourhood of Simla, some species which I did not wish to omit, because doubts had been expressed against the correct determination of some of them. I particularly allude to such species as Blyth's *Platyceps fasciatus*, which is a *Compsosoma*, *Dipsas multifasciata*, Blyth, *Compsosoma Hodgsoni*, Günth., *Tropidonotus platycephalus*, Blyth, with which Steindachner's *Zamenis Himalayanus* is identical, and to a few others. There is at present less occasion to remark much on the fauna of India proper, as it will shortly be published in detail by Dr. T. C. Jerdon in his forthcoming work the "Reptiles of India."

However, the Amphibia and Reptilia of the Andamans and Nicobars had a special interest for me, because the fauna of these islands was as yet less known than that of other parts of India and Burma, and not only promised to yield some novelties, and to elicit the geographical distribution of several Malayan forms, but upon examination of some type specimens in our Museum,

described from these islands, there appeared several doubtful points to be settled. I was, therefore, most anxious to obtain as large a material as was possible, and on two different occasions despatched my collector to those islands. With the very kind assistance of Capt. J. Avern, of the Steamer "Scotia," Capt. Rundell, Assistant Superintendent of the Nicobars, Th. Ad. de Rœpstorff, and Mr. Homfray, at the Andamans, I have not only procured nearly all the species which had been already recorded as occurring on these islands, and several others previously known from India, Burma, Penang and Java, but also a few as yet undescribed forms. It was to be expected that the Amphibien and Reptilien fauna of the Andamans and Nicobars will shew a great similarity to each other; several species of lizards and snakes are common to both, and the whole fauna greatly resembles the Malayan, gradually passing into the Burmese fauna, both being in a great many points very closely related to each other. The detailed lists of species known to occur on the islands will exhibit this more clearly. They will not only shew the distribution of some of our common Burmese and Indian species, but at the same time indicate the peculiarity of each of the small geographical provinces alluded to.

The number of Amphibia as yet known is very small, and there cannot be the least doubt that many more species of frogs will yet be discovered on both the Andamans and Nicobars; tree-frogs especially ought to be numerous in the damp jungles of the Andaman and South Nicobar islands. Of Lacertilia there are several peculiar species, and the genera mostly agree with Malayan forms, such as *Tiaris*, *Ptychozoon*, *Cyrtodactylus*, *Phelsuma*, *Peripia*, *Bronchocele*, and others; a few more are of Indian and Burmese type. Among the Ophidia, the genera are more generally distributed all over India, such as *Python*, *Dendrophys*, *Gonyosoma*, *Composoma*, *Tropidonotus*, *Ptyas*, *Ablabes*, &c. Most of the species from the islands belonging to these genera are also found in Burma, in the Malayan peninsula, and the neighbouring Philippine islands. One of the most marked features in the Reptilian fauna of the Nicobars and Andamans consists in\* the great number of *Trimeresurus*; particularly at the Nicobars, where the jungle appears to swarm

\* *Hydrophidæ*, or the poisonous water-snakes, appear to be comparatively rare, they prefer sandy shores to those surrounded by coral reefs.

with them. Those I obtained from the latter islands only belong to two distinct species, *T. Cantori*, Blyth, and *T. mutabilis*, n. sp., but the number of specimens, particularly of the former species, is very great. An idea of this may be formed from the fact that my collector procured, within a comparatively short time, some 60 specimens of the former and about 30 of the latter species. Fortunately these vipers do not seem to be as dangerous as their allies usually are. I shall speak of their poisonous properties further on, when noticing the various species of the genus *Trimeresurus*.

*T. Cantori* is also common at the Andamans, but *T. mutabilis* seems to be there much rarer. Beside these two, a third species is to be met with at the Andamans; it was called *T. porphyraceus* by Blyth, and also does not appear to be common. It seems to be sufficiently distinct from either *T. carinatus* and *purpureus*, with which it has been considered as identical by different herpetologists.

The following species\* have up to the present been observed from the Andamans.

#### AMPHIBIA.

1. *Rana gracilis*, Wieg m., var. *Andamanensis*.
2. *Bufo melanostictus*, Schneid.

#### REPTILIA.

3. *Hydrosaurus salvator*, Laur.
4. *Gecko stentor*, Cant.
5. „ *verus*, Merr.
6. *Phelsuma Andamanense*, Blyth.
7. *Peripia Cantori*, Günth.
8. *Hemidactylus frenatus*, Schleg.
9. „ *maculatus*, D. and Bib.
10. *Cyrtodactylus rubidus*, (*Puellula rubida*, Blyth).

\* I will mark those species which have been recorded as occurring on the islands, but of which I have not seen specimens, with an asterisk (\*). I may as well notice that the only species which have been described from these islands are those by Blyth, (see Appendix in Mouat's Adventures and Researches among the Andaman islanders, &c., 1863, p. 364), by Theobald in his Cat. of Burmese Reptiles, and some others by Steindachner, published in the scientific results of the "Voyage of the Austrian Frigate Novara," Amphibia and Reptilia, 1865.

11. *Tiliqua carinata*, Schneid.
12. *Hinulia maculata*, Blyth.
13. *Tiaris suberistata*, Blyth, (= *Coryphylax Maximiliani*, Fitz. apud Steindachner).
14. *Ptyas mucosus*, L.
15. *Gonyosoma oxycephalum*, Boie.
16. *Compsosoma melanurum*, Schleg.
17. *Tropidonotus quincunctiatus*, Schleg. (= *T. Tytleri*, Blyth, and *T. striolatus*, Blyth apud Theobald.)
18. *Dipsas hexagonotus*, Blyth.
19. *Dendrophis picta*, Gm.
20. *Lycodon aulicus*, L. (= *Tytleria hypsirhinoides*, Theobald.)
21. *Cerberus rhynchops*, Schneid.
22. *Ophiophagus elaps*, Schleg.
23. *Naja tripudians*, Merr.
24. *Trimeresurus porphyraceus*, Blyth.
25.       ,,       *Cantori*, Blyth.
26.       ,,       *mutabilis*, n. sp.
- 27.\* *Caouana olivacea*, Esch.
28. *Chelonia virgata*, Schweig.
29. *Caretta squamata*, Bont.

From the Nicobars the following are on record—

#### AMPHIBIA.

1. *Rana gracilis*, Wieg m., var. *Nicobariensis*.
2. *Hylorana Nicobariensis*, n. sp.
3. *Bufo melanosticus*, Schneid., var., (= *Bufo spinipes*, Fitz. = *B. gymnauchen*, Bleek.)

#### REPTILIA.

- 4.\* *Crocodylus* sp.

There is no doubt of the occurrence of a Crocodile on the Nicobars. Capt. Rundell informed me that he obtained a small live specimen of one, but it unfortunately did not reach me in time before the steamer left; it is most likely *C. porosus*, Schneid.

- 5.\* *Hydrosaurus salvator*, Laur., (recorded by Blyth).
6. *Ptychozoon homalocephalum*, Kuhl.



7. *Hemidactylus frenatus*, Schleg.
- 8.\* *Tiliqua carinata*, Schneid, (recorded by Steindachner).
9. „ *olivacea*, Gray.
10. „ *rugifera*, n. sp.
- 11.\* *Euprepes (Lygosoma) macrotis*, Fitz. (recorded by Steindachner).
- 12.\* *Typhloscincus Nicobaricus*, Fitz. (recorded by Steindachner).
- 13.\* *Calotes mystaceus*, Daud. (recorded by Blyth.)
14. „ *ophiomachus*, Merr.
- 15.\* *Bronchocele cristatella*, Kuhl, (recorded by Steindachner.)
16. „ *jubata*, D. and Bib.
17. *Tiaris subcristata*, Blyth.
18. *Ablabes Nicobariensis*, n. sp.
19. *Dendrophis picta*, Gmel.
20. *Lycodon aulicus*, L.
21. *Python reticulatus*, Schneid.
22. *Pelamis platurus*, L. (= *bicolor*, Schneid.)
- 23.\* *Platurus laticaudatus*, L. (recorded by Steindachner.)
- 24.\* „ *Fischeri*, Jan, ( „ „ „ )
25. *Trimeresurus mutabilis*, n. sp.
26. „ *Cantori*, Blyth, (= ?? *Trim. labialis*, Fitz. apud Steindachner, see further on)
- 27.\* „ *purpureus*, Gray. This species is also recorded by Steindachner, but as he says that the specimens are in bad state of preservation, they may prove to be unicoloured varieties of *T. mutabilis*, though *purpureus* may also occur, but I have not as yet seen any specimens from the Nicobars.

28-29. Blyth mentions fragments of *Chel. virgata* and *imbricata*, and very likely some more of the Pelagic species will be found. I have myself seen fragments of turtle bones and of their shells with the natives, but I would not venture to identify the species.

Accidentally the number of species upon record from both groups of islands is the same, but the Nicobar fauna appears to be richer, especially in the SCINCIDÆ and AGAMIDÆ, and no doubt may more snakes will also be found. There were several species obtained by

the Austrian expedition, which we have not yet received in Calcutta from these islands. The almost total want of COLUBRIDÆ on the Nicobars is remarkable.

From Penang I have to add to the Amphibia a form which appears to be a third interesting variety of the very variable *Rana gracilis*, and two new species, *Polypedates Hascheanus* and *Ansonia Penangensis* (n. gen. et sp.). Among the Ophidia I procured a new *Trimeresurus*,—*T. convictus*,—rather closely allied to the Himalayan *T. monticola*, Gü n t h., and a very interesting species of *Mabouya*,—*M. Jerdoniana*—which I got on the little Pulo Tickus, close to the northern shore of Prince of Wales island.

I have also added a complete description of the rare *Gecko Smithii*, Gray, a specimen of which was sent to me from Java, and that of what appears to be a full grown specimen of *Tetragonosoma effrene*, Cant., from the island Banca.

From Amherst, near Moulmein, I have recorded a new species of the rare genus *Cantoria*, and from Martaban a very interesting small *Riopa*. At the last locality, I also obtained J e r d o n' s *Diplopelma Carnaticum*, *Caloula pulchra*, Gray, *Hylorana Tytleri*, The o b., *Hinulia maculata*, B l y t h, and some others.

The following is a complete list of the species noted in the present paper; the families are quoted, according to Dr. Gü n t h e r' s work on "Indian Reptiles."

## AMPHIBIA.

### BATRACHIA.

1. *Rana gracilis*, W i e g m., typical.
- „ „ „ var. *Andamanensis*.
- „ „ „ „ *Nicobariensis*.
- „ „ „ „ *pulla*, (from Penang hill.)
2. *Rana cyanophlictis*, S c h n e i d.
3. *Pyxicephalus breviceps*, S c h n e i d.
4. *Polypedates Hascheanus*, n. sp.
5. „ „ *maculatus*, G r a y.
6. *Hylorana Tytleri*, T h e o b. (? = *erythræa*, S c h l e g).
7. „ „ *Nicobariensis*, n. sp.
8. *Ansonia Penangensis*, n. gen. et sp.
9. *Diplopelma Carnaticum*, J e r d.

10. *Caloula pulchra*, G r a y.
11. *Bufo viridis*, L a u r.
12. „ *melanosticus*, S c h n e i d. (= *gymnauchen*, B l e e k.,  
= *spinipes*, F i t z.

## REPTILIA.

## LACERTILIA.

13. *Phrynosoma homalocephalum*, K u h l.
14. *Gecko guttatus*, D a u d.
15. „ *stentor*, C a n t o r.
16. „ *Smithii*, G r a y.
17. *Phelsuma Andamanense*, B l y t h.
18. *Peripia Peronii*, C a n t o r.
19. „ *Cantoris*, G ü n t h.
20. *Hemidactylus frenatus*, S c h l e g.
21. „ *maculatus*, D. & B.
22. *Cyrtodactylus rubidus*, (*Puellula rubida*, B l y t h).
23. „ *affinis*, n. sp.
24. *Tiliqua carinata*, S c h n e i d., (*Eup. rufescens*, S c h a w.  
apud G ü n t h e r.)
25. „ *rugifera*, n. sp.
26. „ *olivacea*, G r a y.
27. *Mabouya Jerdoniana*, n. sp.
28. *Hinulia maculata*, B l y t h.
29. *Riopa lineolata*, n. sp.
30. *Calotes mystaceus*, D. & B.
31. *Bronchocele cristatella*, K u h l.
32. „ *Moluccana*, L e s s.
33. „ *jubata*, D. & B.
34. *Tiairis suberistata*, B l y t h.
35. *Draco volans*, L i n n.

## OPHIDIA.

36. *Cylindrophis rufus*, L a u r.
37. *Ablabes melanocephalus*, G r a y.
38. „ *Rappii*, G ü n t h.
39. „ *collaris*, G r a y.
40. „ *Nicobariensis*, n. sp.

41. *Ptyas mucosus*, L.
42. „ *hexahonotus*, Cant., (*Xenelaqhis idem* apud Günther).
43. *Compsosoma radiatum*, Rein v.
44. „ *melanurum*, Schleg.
45. „ *semifasciata*, Blyth, (*Platyceph idem*).
46. „ *Hodgsoni*, Günth.
47. *Tropidonotus quincuntatus*, Schleg. (*T. Tytleri* and *striolatus*, Blyth).
48. „ *stolatus*, L.
49. „ *platycephs*, Blyth, (*Zamenis Himalayanus*, Steind.).
50. *Gonyosoma oxycephalum*, Boie.
51. *Dendrophis picta*, Gmel.
52. „ *caudolineata*, Gray.
53. *Chrysopelea ornata*, Shaw.
54. „ *rubescens*, Gray.
55. *Psammophis condanurus*, Merr. (*Phayrea isabellina*, Theob.)
56. *Tragops fronticinctus*, Günth.
57. *Dipsas hexagonotus*, Blyth.
58. „ *multifasciata*, Blyth.
59. *Lycodon striatus*, Shaw.
60. „ *aulicus*, L. (*Tytleria* of Theobald).
61. *Tetragonosoma effrene*, Cant. (var.).
62. *Python molurus*, L.
63. „ *reticulatus*, Schneid.
64. *Hypsirhina plumbea*, Boie.
65. *Cerberus rhynchops*, Schneid.
66. *Hipistes hydrinus*, Cant.
67. *Cantoria Dayana*, n. sp.
68. *Bangurus coeruleus*, Schneid.
69. *Ophiophagus elaps*, Schleg.
70. *Naja tripudians*, Merr.
71. *Callophis intestinalis*, Laur.
72. *Enhydrina Valakadyn*, Boie, (= *E. Bengalensis*).
73. „ *shistosa*, Daud.
74. *Pelamys bicolor*, Schneid.
75. *Trimeresurus gramineus*, Shaw.

76. *Trimeresurus erythrurus*, C a n t.  
 77.       ,,       *carinatus*, G r a y.  
 78.       ,,       *porphyraceus*, B l y t h.  
 79.       ,,       *mutabilis*, n. sp.  
 80.       ,,       *Cantoris*, B l y t h.  
 81.       ,,       *convictus*, n. sp.  
 82. *Halys Hymalayanus*, G ü n t h.  
 83. *Daboia Russelii*, S h a w.

## CHELONIA.

84. *Emys crassicolis*, B e l l.

## AMPHIBIA.

## BATRACHIA.

## Fam. RANIDÆ.

1. *Rana gracilis*, W i e g m. (G ü n t h. l. cit. p. 409.)

This species is very common in the Sundarbans, all along the coast of Arracan, near Rangoon, Moulmein, Tenasserim, the Welesley Province, Penang, and apparently also at the Andamans and Nicobars; it usually does not hesitate to take to sea or brackish water, and is, as a rule, a true litoral species.

In specimens from all these localities the coloration is typical, the spots on the back,\* the band between the eyes, and the spots on the lips are never absent, there is, however, no rule as to the presence or absence of the pale dorsal streak; generally it is present and occasionally (on some specimens from Rangoon and Penang), almost as wide as the interspace between the eyes. The body of the largest specimen, I have collected at Akyab (Arracan coast), measured about  $2\frac{1}{2}$  inches in length; this specimen has four ruddy spots on the back between the shoulders, forming a cross. Specimens with the body 2 inches long are comparatively very common. The external surface of the vocal region is black in the male. The length of the snout slightly varies, but it is usually conspicuously attenuated, apparently more so in the males than in the females. In specimens with a narrower snout, the ridges of the vomerine teeth almost touch each

\* In young specimens there is only one transverse somewhat undulating dark band above the middle of the body; the skin is generally distinctly tubercular.

other, in those with somewhat broader snout, the interspace between the dental ridges is more or less widened. As regards the proportions of the length of the legs compared with those of the body, the Arracan and Rangoon specimens are the most true to the type; the legs being stout and the distance from the anus to the metatarsal tubercle equal to, or very little longer than, the length of the body; the toes are half webbed, but in young specimens the webbing appears a little stronger, because the toes are thin and of moderate length, while in old ones, the fourth toe especially is much elongated, and more so in the males than in the females.

In several specimens from the neighbourhood of Moulmein and some others, obtained near the coast at Penang, the distance between the anus and the metatarsal tubercle is conspicuously\* more than the length of the body, the difference amounting to about  $\frac{1}{3}$ th of the length of the body, the specimens are also a little more slenderly built, but no other specific difference exists, except that in some specimens, the toes are conspicuously slender and elongated, so as to make the webbing appear to be still less than in Arracan specimens.

a. As variety **Andamanensis** may be distinguished, the form occurring on the Andamans. I have examined four specimens from Port Blair. Of the smallest the body is about one-third of an inch long, of the two next above one inch, and of the fourth  $2\frac{1}{3}$ rd inches. In all the specimens the snout appears a little shorter and more obtuse than in typical *gracilis*, and the hind feet are decidedly more slender, and proportionately longer than in that form. In the first specimen the difference is equal to  $\frac{1}{7}$ th of the length of the body, in the two of middle size it is  $\frac{1}{5}$ th in one and a little less than  $\frac{1}{5}$ th in the other, in the large specimen it is very nearly  $\frac{1}{6}$ th; one of the specimens has a thin vertebral streak, the others none; the chin and breast are spotted with black, mostly conspicuous in those of median size.

The rest of the characters and the coloration remains true to the type, except perhaps the webbing of the toes, appearing to

\* In one specimen, noted in the list of measurements as *e*, the feet are proportionately very long, but they are not slender to the same extent, as they are in the Andaman variety.



be a little stronger than in most other specimens; the web reaches to the tip of the third, but not to that of the fifth toe; the fringe on the external edge of the fifth toe is almost obsolete. The tubercles which are in young specimens very distinct on the body, and above the eyes, become also nearly quite obsolete in the old frog.

Although at the first sight the greater length of the legs and the obtuse snout appear to be striking differences, I don't think that they are sufficient to regard this insular form as distinct from the continental, particularly so, when we observe the changes in the length of the legs of the Arracan and Rangoon specimens, and those from the Welesley province. Possibly the above noted differences may in time become better developed, and may then be considered as of specific value: that is — a *local race* may in time become a *species*.

*b. var. Nicobariensis.* From the Nicobars, in the neighbourhood of the Nancowri harbour, I obtained one peculiar young specimen. The body measures  $1\frac{1}{4}$ th inch, and the distance between the vent and metatarsal tubercle is slightly more than that of the length of the body, thus in this point coming up very near to the typical Arracan specimens, but it has the short snout of the *var. Andamanensis*, and of the next variety from Penang. It differs, however, from both in the very slight webbing of the feet, the toes being considerably elongated and slender, the fourth equals in length to very nearly half the body, the disks are slightly swollen, and the web is almost only basal, it hardly extends to half the length of the toes; the cutaneous fringe on the edge of the fifth toe is slight but distinct, and the tubercle at the base of the fourth toe obsolete. The skin is, like in other young specimens of *gracilis*, finely tuberculated, and the whole habitus and coloration identical with type specimens; the lower side is finely mottled with dusky, as in *Andamanensis*.

*c. var. pulla.* As a further variety of *R. gracilis* I regard two specimens which I obtained in a small pool of water at a height of about 2,000 feet on the Penang hill. One is only  $\frac{6}{8}$ th, and the other  $\frac{7}{8}$ th of an inch long; they agree with the Andaman variety in the somewhat obtuse form of the snout, spotted chin and breast and the

slenderness of the feet; in the first the difference of the distance between the anus and the metatarsal tubercle, and that of the body is  $\frac{1}{8}$ th more of the length of the latter, in the second specimen it is nearly one-sixth; but in both specimens the toes are proportionately shorter and more fully webbed; the fifth toe has the cutaneous fringe as distinct as in typical *gracilis*. The colour of the fresh specimens was a light brown with green spots, perfectly identical in distribution with those of *gracilis*, with which also the tubercles on the back entirely agree; these two specimens have no dorsal streak.

When viewed independently from other specimens, nothing would be easier than to regard the above noted Penang small variety as a distinct species, for, in addition to the obtuse form of the snout, and the greater length of the legs noticed in the Andaman variety, we have in this a complete webbing of the toes. However, there is in any case, at present no sufficient reason for doing this. For I have already noticed that in young specimens of typical *gracilis* the toes appear stronger webbed than in old ones, and as the two specimens from the Penang hill are evidently young ones, they may shew this development accidentally more, than perhaps other specimens in the same locality would do. Until this has been sufficiently ascertained, the other more constant characters consisting in the form of the body, and also the very characteristic coloration must be regarded as more important than the peculiarity of a known variable character.

In all these varieties quoted above the constancy in coloration is most marked. I do not regard the more or less pointed or obtuse snout as a character of great importance, for it varies considerably in specimens of one and the same locality in different stages of age, and apparently also in the sexes. Neither would the reference to the greater or lesser length of the hind limbs appear to be very important, but that the webbing of the toes should vary so considerably as noted above, is really very remarkable; and I would certainly have separated the Andaman and the small Penang form as distinct species—on account of shorter snout, longer limbs and stronger webbing of the toes,—had I not obtained from the Nicobars, situated geographically between both, a form which has the short snout of the two last varieties, but the proportionately short

limbs of the type form ; on the other hand, however, a very slight webbing, distinct from all others !

I hope to be able to give illustrations of all these forms, as soon as I may be placed in possession of more extended materials which, I trust, will be sufficient either to confirm the present determination, or to shew that what I pointed out as varieties are in reality to be considered as distinct species. I can now only repeat that, whatever anxiety some herpetologists may feel regarding the consistency of the species in question, I cannot view those insular forms, on comparing them with hundreds of specimens which I myself collected in the Sundarbans, Arracan, Rangoon and down the Tanasserim coast to Penang, as anything else but local varieties of one and the same species. I shall now only add the actual measurements of the principal forms.

Measurement in inches.	Typical form, Arracan, toes half webbed.		Moulmein, toes half webbed.		Penang, the low land form, toes $\frac{2}{3}$ th webbed.		var. <i>Andamanensis</i> , toes $\frac{2}{3}$ th webbed.		var. <i>Nicobariensis</i> , toes $\frac{1}{4}$ th webbed.	var. <i>pulla</i> , toes fully webbed.
	a	b	c	d	e	f	g	h	i	k
Length of body, ...	$1\frac{6}{16}$	$2\frac{9}{16}$	$1\frac{7}{16}$	$2\frac{3}{16}$	2	$1\frac{11}{16}$	$1\frac{2}{16}$	$2\frac{6}{16}$	$1\frac{5}{16}$	$\frac{14}{16}$
Distance from vent to metatarsal tubercle, .....	$1\frac{7}{16}$	$\frac{10}{16}$	$1\frac{8}{16}$	$2\frac{7}{16}$	$2\frac{8}{16}$	$1\frac{14}{16}$	$1\frac{5}{16}$	$2\frac{11}{16}$	$1\frac{7}{16}$	$1\frac{1}{16}$
Length of fourth toe, .....	$\frac{23}{2}$	$1\frac{2}{16}$	$\frac{23}{32}$	$1\frac{1}{16}$	very nearly $1\frac{2}{16}$	$\frac{14}{16}$	$\frac{9}{16}$	$1\frac{2}{16}$	$\frac{11}{16}$	nearly $\frac{7}{16}$
Total length of hind limb, .....	$2\frac{5}{32}$	$3\frac{12}{16}$	$2\frac{7}{32}$	$3\frac{8}{16}$	$3\frac{10}{16}$	$3\frac{21}{16}$	$1\frac{14}{16}$	$3\frac{13}{16}$	$2\frac{2}{16}$	$1\frac{8}{16}$

The varieties from Moulmein and (i) *Nicobariensis* are almost identical in measurements.

2. *Rana cyanophlyctis*, Schneid. (Günth. l. cit. p. 406).

This species has been collected by Dr. F. Day in Orissa where it appears to be common. Specimens measuring up to 3 inches in

length of the body are also not rare in the Sundarbans, and the species here principally lives in pools of water which is more or less brackish.

3. *Pyxicephalus breviceps*, Schneid. (Günth. l. cit. p. 411).

A specimen was obtained by my collectors in the forests above Kotegurh at about 7000 feet; body measured  $2\frac{1}{4}$ ", the hind leg  $2\frac{3}{5}$ ".

*Fam.* POLYPEDATIDÆ.

4. **Polypedates Hascheanus**, n. sp. Pl IX, Fig. 3.

Body moderately slender, anteriorly rather wider than posteriorly and depressed; skin smooth or with few indistinct small tubercles except above the eyes; snout moderate, obtuse, slightly longer than the distance between the eyes; fore foot, when laid forward, exceeds the snout nearly by the whole length of the first finger; the distance between anus and heel is slightly less than the length of the body; tympanum round, smaller than the eye; the dorsal glandular fold is rather indistinct on the forepart of the body, but clearly traceable on the posterior half of it, a second glandular fold runs from the hind edge of the orbit above the tympanum to the upper arm; toes slightly webbed in young specimens, but in the largest specimen observed they are about one-third webbed; only the terminal disks of toes are conspicuously flattened and enlarged; the inner metatarsal tubercle is large and compressed the outer at the base of the fourth toe almost obsolete; vomerine ridges very small and distant, but present even in the smallest specimens less than half an inch long.

Colour above lighter or darker olive brown with few irregular small spots, (sometimes, though rarely pale, almost yellowish olive); with a black band between the eyes, edged with light in front, followed by a W mark, the ends of which begin almost behind the eyes, a pair of somewhat indistinct blackish spots below the middle of the body; sides of the front part of the body black, lips slightly spotted with white, a large white spot behind the angle of the mouth, sides of body mottled and punctated with white and black limbs with dark brown cross bands; lower parts whitish olive mottled and finely punctated with dusky, especially on the sides about the fore and on the hind limbs.

I found this species tolerably common all through the higher forests (about 1000 feet above sea level) in the island of Penang; it does not seem to grow to a large size, for though I have seen hundreds of specimens in different places of the island, the largest I obtained, only measures  $\frac{1}{16}$ " in length of body, the distance from anus to heel, is  $\frac{1}{16}$ " inches, the fourth toe  $\frac{7}{16}$ " and the total of hind limb  $1\frac{9}{16}$  inch. The usual size of the specimens is only  $\frac{9}{16}$ , and nearly  $\frac{9}{16}$ ,  $\frac{4}{16}$ ,  $\frac{1}{16}$  inches in the other corresponding measurements. It is generally seen on the leaves of small bushes or on the ground between old leaves; it is very active and on account of its very small size rather difficult to secure.

I have great pleasure in naming this species after my friend Alfred Hasche who has very kindly assisted me in my researches on the island.

5. *Polypedates maculatus*, Gray, (G ü n t h. l. cit. p. 428.)

A variety of this species is not uncommon in Penang. Live specimens were of a yellowish brown colour with greenish tinge, the head much darker than the rest and with a distinct bluish tinge, the whole of the upper surface very minutely punctated with dark specks; a short blackish partially interrupted streak below the tympanoid fold; all four feet with indistinct cross-bands, the hinder side of the femora blackish, spotted with white: the extreme edge of the upper lip white; below uniform yellowish white. The skin in young specimens is very finely granular above, in old ones it becomes smoother, especially on the posterior half of the body.

6. *Hylorana Tytleri*, Th e o b. Pl. IX, Fig. 1.

Cat. Rept. Asiat. Soc., Museum, p. 84.

(an idem *Hylorana erythræa*, Schleg. G ü n t h. l. cit. p. 425.)

I have collected near Moulmein two specimens which I was first inclined to regard as a variety of *H. erythræa*. There is no essential difference in the measurements of the two.

	a. full grown.	b. young.
Length of body, .....	2 inch.	$\frac{1}{16}$ inch.
Distance from vent to heel, ....	$1\frac{1}{16}$ "	nearly $\frac{9}{16}$ "
Length of fourth toe, .....	$\frac{1}{16}$ "	$\frac{4}{16}$ "
Total length of hind leg, .....	$3\frac{5}{16}$ "	$\frac{1}{16}$ "



The snout is somewhat narrow in the more fully grown specimen. The fourth toe is rather short, the web reaching to the tip of the third and fifth toe. The first toe has at its base a very prominent laterally compressed tubercle, and another considerably smaller tubercle is at the base of the fourth toe, the last is not mentioned by Günther or Dum. and Bibron in the description of *erythræa*. The upper glandular fold is as usually distinct, the lower begins above the base of the upper lip, is interrupted above the humerus, then bends downwards as a short fold and disappears without continuing along the side of the body. From the upper hinder edge of the tympanum also a short thickened fold runs to the humeral tubercle. This character also occurs on two other specimens of unknown habitat in the Asiatic Society's Museum, but in the one named *Tytleri* by Thobald, there seem to be, besides the short curved glandular ridge, slight traces of its lateral extension, it being broken up until it disappears on the posterior middle part of the belly. In this last specimen the toes are also fully webbed, and the fourth toe is little more than half the length of the body, as in typical *erythræa*. The lower portions of the femora are distinctly granular.

The Moulmein young specimen is dark brownish green above, black on the sides, the old one olive green above, blackish on the anterior half of the sides, and mottled with black on the posterior; the glandular folds are white, the upper lips with a white streak, but their edges are blackish; the lower parts are pale mottled with black on the anterior half; the hinder parts of the femora are also mottled or marbled with black, but the upper sides of both fore and hind limbs are brown banded. This last coloration is also never mentioned in the published descriptions of *erythræa*, though Schlegel's figure apparently seems to indicate it on the tarsal portion of the hind limbs.

It would seem, without a comparison of typical specimens of *erythræa*, rather difficult to state whether our Lower Bengal and Burmese specimens have to be specifically separated from *erythræa*, or not, but with all the apparent very great similarity they really seem to me to be distinct. In Thobald's type specimen\* of

\* This is the Dacca specimen to which Blyth alludes when he says of *Hylorana (Lymnodytes) macularia* (Journal, Asiatic Society, Bengal, XXIII,



*H. Tytleri* the measurements almost perfectly agree with those of *erythræa*, the body is by nearly half the length of the snout longer than the distance between vent and heel, and the fourth toe is slightly more than half the length of the body. There are, however, two distinct metatarsal tubercles of which the one on the first toe is very prominent and large, and the legs are banded brown above. If these last characters never occur in *erythræa* of the southern regions, the specific name *Tytleri* will have to be reserved for our form. The indistinct continuation of the lower glandular fold on the body cannot be taken into consideration, neither the somewhat elongated form of the fourth toe, for there can be no doubt that the two above mentioned specimens from Moulmein, and two others in the Museum, (either also from Lower Bengal or from Burma), are identical with Theobald's *Tytleri*, and in all these, the lower glandular fold bends down behind the fore limb and then disappears; the fourth toe also is slightly shorter than half the length of the body; in other characters all the specimens entirely agree.

### **Hylorana Nicobariensis**, n. sp. Pl. IX, Fig. 2.

In its slender habit resembling the last, but the snout is narrower and more obtusely rounded than in that species, its end very little projecting above the lower jaw; canthus rostralis rounded; loreal region slightly excavated; tympanum round, almost circular and little smaller than the eye; skin in the males above, finely granular, more distinctly so posteriorly, lower side of the femora coarsely granular; in the females the skin is smoother; a distinct gland runs from behind the eye on each side of the upper edge of the back; a second gland is indicated by two tubercles, one behind the angle of the mouth and the second posterior to it above the humerus, and in some specimens there is even a third much smaller tubercle present from which a short rim bends downwards; all these glands, however, are much less distinct in very young specimens.

p. 299), that it differs from *erythræa* "by its shorter and stouter limbs and short anterior digits, &c." Günther's somewhat sarcastic remark (l. cit. p. 425) on that point is uncalled for, because Blyth's type of *macularia* is actually  $2\frac{3}{4}$  in total length, and the distance from vent to heel only two, consequently less than that of the body, and the limbs are thus actually stouter and shorter than in the specimen described by Günther, though both no doubt are the same species.

The disks of the fingers and toes are well developed, on the latter the web reaches fully up to the tip of the third and fifth toes. The second and fourth fingers are sub-equal, and the third is about one-third longer than the fourth. Two metatarsal tubercles are present, the marginal one at the base of the first toe is elongated and laterally strongly compressed, the other which is smaller and rounded is placed at the base of the fourth toe. The length of the body (measured in 8 full grown and 5 young specimens), is somewhat more than the distance between the anus and heel, and the fourth toe is shorter than half the length of the body. The following are the actual measurements of two of the largest specimens :

	♂	♀
Length of body, . . . . .	2 inch.	1 $\frac{1}{8}$ inch.
Distance from vent to heel, . . . . .	1 $\frac{1}{8}$ "	1 $\frac{1}{8}$ "
Length of fourth toe, . . . . .	$\frac{1}{8}$ "	$\frac{1}{8}$ "
Total length of hind limb, . . . . .	3 $\frac{1}{8}$ "	3 $\frac{3}{8}$ "

In comparing these measurements with those given of the Moulmein *H. Tytleri*, the two will be found to be almost identical. And this first led me to believe that the present species may only be a variety of *Tytleri* (? *erythraea*), but the larger tympanum of *Nicobariensis*, the usual total want of the short downward bent lower glandular fold, the better developed disks of the fingers and toes, the greater length of the third finger, then the presence of two almost sub-equal tubercles at the base of the toes, a distinctly larger gape of the mouth, somewhat more distant ridges of vomerine teeth, &c., &c., are so well marked in all the specimens examined that, on comparing them with the corresponding characters of *Tytleri*, the conclusion seems fully justified that the Nicobar form indicates a sufficiently distinct specific type.

Colour above olive greenish, much darker and almost black in some male specimens, upper glandular fold pale, upper lip whitish, lower glandular tubercles usually purely white ; sides of body including the loreal region black, which uniform colour, however, fades on the posterior part of the body and is sometimes replaced there by a few dark spots. Lower parts more or less mottled with black, sometimes almost wholly black in the males, but yellowish between the

thighs; in the females, the lower parts are whitish, either uniform or only slightly dusky. Fore limbs with few indistinct cross bands, a dark streak in front of the upper arm, and another one behind, as well as on the lower arm; hind limbs above banded with brown, behind indistinctly mottled with dark and yellow.

In coloration and in the development of the disks of the fingers and toes, &c., this species much resembles *H. temporalis*, G ü n t h., (l. cit. p. 425) from Ceylon. But in this species the hind limbs appear to be in proportion longer, the snout is much broader, the third finger shorter, and it is said to have "no glands behind the angle of the mouth." In *Tytleri* the lower glandular tubercle commences between the tympanum and the upper angle of the mouth; in *Nicobariensis* that tubercle is situated behind and rather almost below the angle of the mouth.

*Fam.* RHINODERMATIDÆ apud G ü n t h e r.

No maxillary or vomerine teeth; ear and tympanum developed; toes webbed; sacral vertebra dilated; no paratoids.

**Ansonia**, n. gen.

Body slender, elongated, rather depressed, uniform in width; sacral vertebra much dilated; muzzle short, obtuse; limbs long and slender; fingers four long, smooth, free and peculiarly cylindrical; toes five, not much developed, half webbed; disks of fingers and toes slightly swollen, rounded.

The great peculiarity of this genus rests in the slender form of the body and the great length and slenderness of the limbs, and especially of the fingers. In the general character it more reminds of *Phryniscus*, than any of the genera of the RHINODERMATIDÆ, referred to this family by G ü n t h e r, but it is readily distinguished from the former genus by the tympanum and open eustachian tubes. I have associated with this new form, the name of my esteemed friend, Col. Anson, the present Governor of Penang, who has shewn the greatest interest in my natural history researches during my short stay on the island.

8. **Ansonia Penangensis**, n. sp. Pl. IX, Fig. 4.

Body slender and long, almost with parallel sides throughout; muzzle short and blunt in front, shorter than the interspace between

the eyes; the whole of the upper and lower skin, except on chin and throat, tuberculated; tympanum distinct, smaller than the eye; tongue elongated, elliptical, rather thick, entire; fore limb as long as the distance between the hinder edge of eye to the posterior end of body, distance from anus to heel nearly as long as the body; hand on the inner side with a large ball; first finger shortest, then comes second, then fourth, and the third is longest, all are cylindrical and with slightly dilated and smaller disks at the end; toes half webbed, rather short; metatarsal tubercles indistinct, a large flat one at the base of the first toe and a small slightly more prominent one at the base of the fifth toe; in young specimens they are not developed. Above uniform ashy, marbled and reticulated with black; sides of head and body, and the limbs with rather large pale orange or yellowish warts or spots, lower parts dusky with small white spots, especially on the sides of the belly and in front of the shoulders; lower part of belly and the inner thighs of a beautiful rose colour in life specimens. The measurements of two specimens of different sizes are as follows:

	<i>a.</i>	<i>b.</i>
Length of body, . . . . .	$\frac{8}{16}$	$\frac{14}{16}$ inches.
Length of fore limb, . . . . . (nearly)	$\frac{7}{16}$	$\frac{11}{16}$ „
Distance from anus to heel, .. (nearly)	$\frac{8}{16}$	$\frac{12}{16}$ „
Length of fourth toe, . . . . .	$\frac{3}{16}$	$\frac{5}{16}$ „
Total length of hind limb, . . . . .	$\frac{13}{16}$	$1\frac{5}{16}$ „

I have only obtained four specimens of this interesting species on Penang, two near the great water-fall (above the Alexandra bath), and two in a narrow gorge about half way up the Penang hill. In both cases, the specimens were found flatly attached to the side of the rock above the water, and did not make the slightest attempt to escape when taken from it. This habitat seems peculiar, and corresponds with that of a new species which Dr. J e r d o n lately received from South India through Major B e d d o m e (vide Proc. Asiat. Soc. for March, 1870, p. 85). In general form and style of colouring our species much reminds of *Ixalus opistorhodus*, lately described by Dr. G ü n t h e r from a Nilgheri specimen (Proc. Zool. Soc., 1868, p. 484, pl. 37, fig. 3.)

9. *Diplopelma carnaticum*, J e r d., Pl. IX, Fig. 5.

*Engystoma carnaticum*, J e r d o n, Journ. Asiat. Soc., Beng.  
1853, XXII, p. 534.

Body moderately stout with proportionate limbs; snout short, obtuse, its length being equal, or hardly equal, to the width of the head between the eyes; a front limb when laid forward exceeds the snout by half the length of the third finger; length of body equal to, or very little less, than the distance between the anus and the metatarsal tubercle; length of fourth toe equal to, or less than, half the length of the body; skin on the posterior part of the femora extended as in *Caloula*; fingers and toes with small rounded disks; two metatarsal tubercles, the one at the base of the first toe is elongated and compressed, the other at the base of the fifth toe either a little larger, or scarcely smaller and rounded; toes only webbed at the base, their length variable.

Color above isabella or yellowish brown, with a dark bottle-shaped mark along the back beginning between the eyes with a tris-cusped edge, after which it contracts, then again widens, and a little below the middle of the body divides in two pairs of branches, of which the posterior extends to the base of the femora; a triangular black mark about the anus, extending below; on each side of the median brown mark are undulating longitudinal dusky streaks, these lateral portion of the back are sometimes, during life, tinged with rose colour, similar to *Caloula pulchra*; limbs with brown cross bars, sides dark, purplish black, this color disappearing posteriorly, an oblique pale streak extending from the eye towards the shoulder; below dull whitish, mottled with dusky, especially on chin and throat.

This is, as Dr. J e r d o n (Proc. Asiat. Soc., March, 1870, p. 85) remarks, a wide spread species. I am indebted to him for the identification of my specimens, their colouring being almost perfectly identical with his original drawing from which the scanty notice of *Eng. carnaticum*, published nearly 20 years ago in the Society's Journal, was taken. It was originally described from the Carnatic; numerous specimens exist from Beerbhoom in the Asiat. Soc. Col.; Dr. J e r d o n obtained it in the Khasi hills, and I found



three specimens under a large block of wood at Martaban (near Moulmein) in company with one small *Caloula pulchra* and young specimens of *Bufo melanosticus*.

The measurements of my specimens are as follows:—

	<i>a.</i>	<i>b.</i>	<i>c.</i>
Length of body, .....	$\frac{12}{16}$	1	1 inch.
Distance from anus to metatarsal tubercle, .....	$\frac{14}{16}$	1	$1\frac{2}{16}$ „
Length of fourth toe, .....	$\frac{13}{32}$	$\frac{15}{32}$	$\frac{8}{16}$ „

Specimen *c* has a pale median dorsal streak extending the whole length of the body, the two others have none.

10. *Caloula pulchra*, Gray, (G ü n t h., l. cit. p. 437).

In spite of the dilated disks of the toes and fingers, this remarkable Batrachian is by no means arboreal in its habit. I twice observed it near Moulmein. It appeared after sunset about the same time as *Bufo melanosticus*, crawling on old wood and feeding on white ants.

In external character both *Caloula* and *Diplopelma* are very closely allied, and young specimens of the former, in which the vomerine ridge is not developed, can strictly speaking hardly be distinguished from the latter, except by the slightly more dilated disks of the toes. I am even not quite certain whether the distinctions between the two are really such as to entitle them to generic rank, which doubt especially becomes apparent, when we compare the descriptions of the two other Burmese species of *Diplopelma* described by Blyth; in any case when kept distinct they should be classed close together in one family.

Fam. BUFONIDÆ.

11. *Bufo viridis*, Laur. (G ü n t h., Cat. Bat. Brit. Mus. p. 58).

Steindachner (Nov. Exped., Amph. p. 40) already recorded this species as occurring in Spiti. It is found throughout the Sutlej valley from Kotegurh upwards, but is always rare. At Kotegurh, between 6 and 9000 feet, it is occasionally met within localities where *B. melanosticus* also occurs, but further to east in Kunavar,



the latter is not found, and in Spiti only *B. viridis* is met with, usually between 11 and 13,000 feet, though far from common. At the village Gieumal, I found a small specimen at about 15,000 feet, which is probably the highest locality from which a Batrachian was ever recorded.

12. *Bufo melanosticus*, S c h n e i d, (G ü n t h., l. cit. p. 422). (Syn. *Bufo isos*, D. and B. =? *B. gymnauchen*, B l e e k., = *B. spinipes*, F i t z.).

Younger specimens of this species are, as a rule, much more slender than old ones, and the same applies to the form of the paratoids; they are dark ashy (rarely light brown) variegated with black. There are, however, very many variations to be observed in both the length of the body and of the paratoids. The width of the head also greatly varies. The species is said not to possess a rim on the inner edge of the tarsus, some specimens have it, however, distinctly indicated, either as a short continuous fold, or as a row of somewhat enlarged tubercles; this can be seen in specimens from about Calcutta, and I observed the same also in some of the younger and half grown ones from near Moulmein, Penang, Malacca, Singapore, the Andamans and Nicobars. Himalayan specimens from the Sutlej valley, and some of the specimens from the interior of the Andamans, and one or two from Moulmein, hardly possess a trace of it, but all these are of large size, having the tarsus particularly thickened and rounded.

S t e i n d a c h n e r (Amphibia der Novara Exped. p. 42,) justly, I think, questions the specific difference of *Bufo isos*, D. and B., (or ? *B. gymnauchen*, B l e e k.), from *B. melanosticus*, stating that in the latter, considerable variations exist as to the more or less complete webbing of the toes. I also find that it is impossible to attribute to this character within certain limits much specific value. The pure land forms, such as those from the Himalayas, from Upper Bengal, from the interior of the hills east of Moulmein and from the jungles of the Andamans, usually have the toes more elongated, and consequently they appear to be only moderately webbed. The webbing extends on the fourth toe to about half its length, and is further on only indicated by a minute ridge on either

side. In many specimens from Lower Bengal, particularly in some from the Sundarbans, in some from Moulmein, Penang, Malacca, Singapore, the Nicobars and in others from the Andamans,—that is, in such forms which are always found near the water,—the webbing appears stronger, principally on account of the toes not being so much elongated, or the webbing is in reality more developed; but the transition from one form into the other is so gradual, that no specific distinction can be attached to it.

Considering these differences in the webbing of the toes and the usual indication of a tarsal fold in authentic *melanosticus*, I can hardly see the reason for which *Steindachner* retained *Fitzinger's* *Bufo spinipes* from the Nicobars as a distinct species, (l. cit. p. 43). I have compared several specimens from Nancowry and Camorta, and cannot detect any specific distinction from *melanosticus*. The more slender form is only a character of young and middle age, though it is sometimes retained by specimens attaining a length of five inches. I have seen such specimens in abundance near Moulmein, on the sea coast at Malacca and the Wellesley province.

The webbing in the Nicobar form is moderate, such as in some Andaman specimens, and the young from both islands are always rather dark ashy, much marbled with black, and the body is greatly elongated. My largest specimen from the Nicobars is  $2\frac{1}{2}$  inches, and one paratoid gland is somewhat less than one-third the length of the body, which is as a rule also the case in specimens of *melanosticus* from other localities; in Malacca specimens only it is sometimes nearly one-fourth; these have also an equally slender and long body as those from the Nicobars. *Günther* considers *spinipes* (Records 1867, p. 146) as identical with *gymnauchen* which he apparently acknowledges to be distinct from *melanosticus*, (see also Proc. Zol. Soc., 1868, p. 479).

The largest specimen of *melanosticus* I saw, is from near Moulmein, measuring  $6\frac{1}{2}$  inches in the length of the body.

[To be continued in the next number.]

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## EXPLANATION OF PL. IX.

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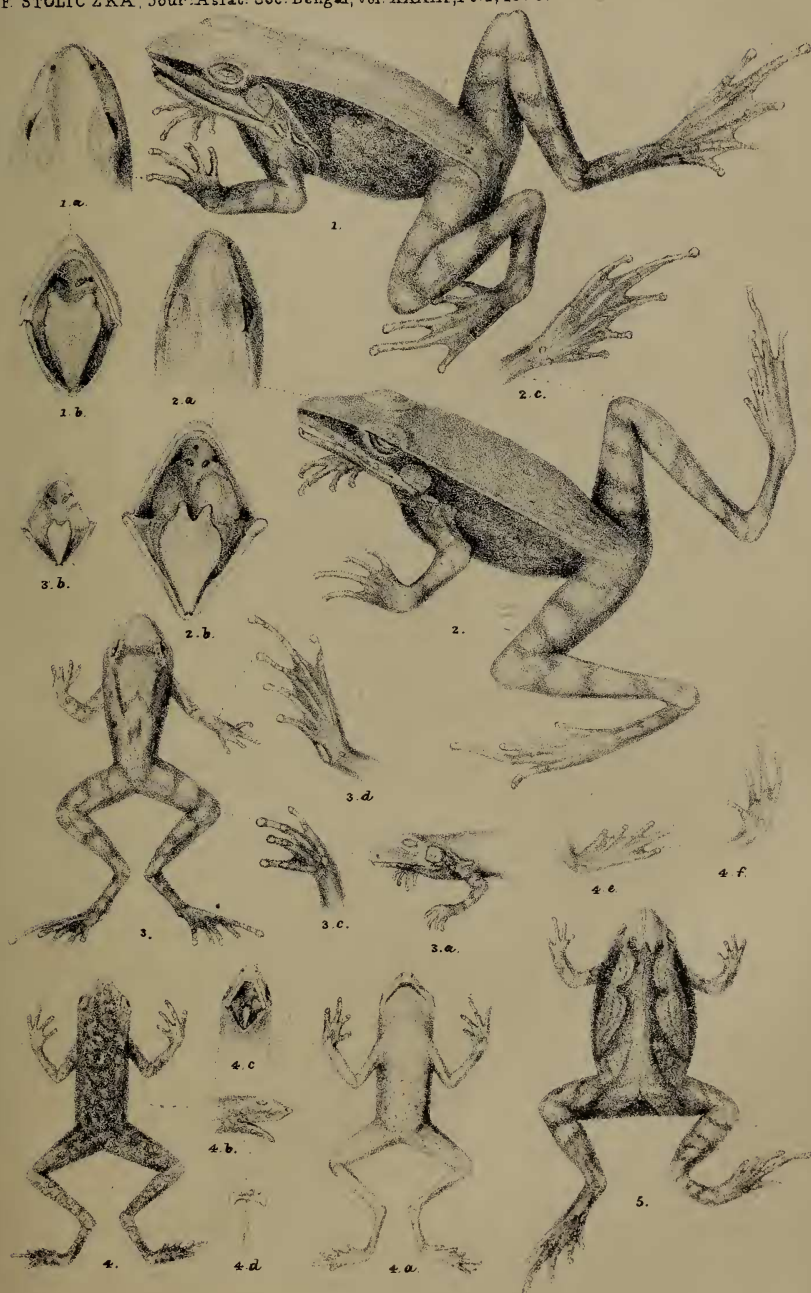
Fig. 1. *Hylorana Tytleri*, Theob., 1, side view, the toes of the right hind limb shewn internally; 1 a. upper view of the head; 1 b, interior of the mouth, shewing the tongue and the vomerine teeth, &c., from Moulmein.

Fig. 2. *Hylorana Nicobariensis*, n. sp.; 2, side view; 2 a, head from above; 2 b, interior of the mouth; from the Nicobars.

Fig. 3. *Polypadates Hascheanus*, n. sp.; 3, view from above, 3 a, anterior half of the body from the side; 3 c, interior of the fore- 3 d, interior of the hind limb; the two last figures enlarged; from Penang.

Fig. 4. *Ansonia Penangensis*, n. sp.; 4, 4 a, dorsal and ventral views, 4 b, side view of the head; 4 c, front part with the mouth opened, shewing the form of the tongue; 4 d, sacral vertebra with the coccygial style; 4 e, interior of the toes of one hind limb, 4 f, interior of the left hand, the two last figures enlarged; from Penang.

Fig. 5. *Diplopelma Carnaticum*, Jerd., upper view, from Martaban, near Moulmein.



1. *Hylorana Tytleri*, Theob.  
2. " *Nicobariensis*, n. sp.

3. *Polypedates Hascheanus*, n. sp.  
4. *Ansonia Penangensis*, n. g. et sp.  
5. *Diploelma Carnaticum*, Jerdon.